ENHANCED RECHARGE CARD MANAGEMENT SYSTEM
WITH RESELLER USERS' SECURITY AND ACCESSIBILITY

Technical Field

5   This invention relates to a method and apparatus for a recharge card management system.

Background of the Invention

Telecommunication customers are billed in one of two ways. Postpaid customers are billed by accumulating charges for a call in a billing system and

10   subsequently using the accumulated charges to prepare a bill that is sent to the customer. Prepaid service is provided by allowing customers to build up a prepaid account and subtracting from this account the amount of any charges for each call.

In accordance with one prior art of prepaid charging method, customers can purchase recharge cards (scratch cards) which can be used by the customers to

15   increment the amount stored for these customers in their accounts. Such cards can only be purchased from the service providers, and retailers and/or distributors which are associated with service providers. A customer who has purchased such a card can communicate with an interactive voice response (IVR) system to enter data on the card. A wireless customer is identified by the mobile identification

20   number (MIN) or mobile directory number (MDN). A wireline customer is identified by automatic number identification of the calling line. The prepaid administration system uses the customer's identification, plus other data entered by the customer, to access and modify the data in the customer's account. There is a recharge card management system which stores the recharge card information,

25   including card batch and serial number, card number (or PIN), card face value, and card status. The prepaid administration system will validate the recharge card information on the recharge card management system by providing customer identification, card number (or PIN). The recharge card management system validates the card status, if it is valid and activated, it will respond the prepaid

30   administration system with card face value. The prepaid administration system then increments the customer's prepaid account.

A problem of the prior art is that the recharge card management system is accessible and manageable by the service providers only. Independent resellers and retailers can not access and manage the recharge cards, including creation of

scratch cards, viewing and modifying card information and status - such independent resellers can advertise the prepaid cards and thus help to bring more business to the service providers. In addition, such resellers may have a large number of points of sale to make it more convenient for customers to purchase the

5   scratch cards. A problem of the prior art is that there is no satisfactory arrangement for allowing independent resellers or retailers to access and manage the recharge card management system securely and to sell such scratch cards to customers.

Summary of the Invention

10   The above problem is solved and an advance is made over the teachings of the prior art in accordance with this invention wherein the recharge card management system can be accessed and managed by both service providers and independent resellers; while the service providers can access and manage all of cards, the independent resellers can only access and manage cards belonging to the

15   reseller. Both service provider users and independent reseller users of the recharge card management system can create a scratch card batch or a group of batches. The scratched card batch (and group of batches) created for a reseller is identified through the account identification of this specific reseller and stored in the database of the recharge card management system which can be accessed and

20   modified only by the system users of this reseller with the same account identification or the service provider administration users. Any other reseller user (with different account identifications) will not be allowed to access the card information. If there is a hierarchy of resellers, each reseller can access data only for accounts of resellers below it in the hierarchy. Advantageously, with this

25   arrangement data for individual resellers identifies the scratch cards that they are authorized to manage and sell; therefore only the reseller that is authorized to sell particular scratch cards can sell these cards and be billed by the service provider when such scratch cards are replenished.

In accordance with one preferred embodiment of Applicants' invention,

30   even though the recharge card management system is maintained by the service providers, resellers and distributors are authorized to manage the recharge card through the recharge card management system. Access includes creating a scratch card batch or group of batches (each of them associated with the account identification of resellers themselves), search and view card information for cards

having the same reseller account identification, changing card status

(activated/deactivated, deleted/canceled, expired, used) for cards having the same

reseller account identification. The service provider users of the recharge card

system can create a scratch card batch or group of batches to be assigned to any

5   reseller account identification as needed, and search and view the card information

and modify the card status for the cards belong to all resellers and retailers. When

a customer accesses the prepaid administration system used for updating prepaid

accounts via the interactive voice response (IVR) or internet, the customer

provides the scratch card information and account identification (MIN or MDN for

10   mobile phone). Sometimes the IVR can automatically identify the MIN or MDN.

The prepaid administration system searches the subscriber database and finds out

the reseller or distributor account identification for this customer. When a mobile

phone is issued by this reseller, the reseller account identification is stored in the

database of the prepaid administration system. The prepaid administration system

15   then queries the recharge card management system with the scratch card number

inputted by the customer. The recharge card management system verifies that the

scratch card is legitimate, identifies the reseller to whom this scratch card was sold,

and verifies the face value of the scratch card through its database. If the card is

valid (i.e., activated), the recharge card management system returns the face value

20   of card along with the reseller account identification associated with this card back

to the prepaid administration system. If the card is used, expired, canceled, or

deactivated, the recharge card management system will return an error response.

When the prepaid administration system receives the positive response with card

face value and reseller account identification, it compares the account

25   identification with that obtained from its own database. If the two match (i.e., the

scratch card is issued by the same reseller of the mobile phone subscriber), the

prepaid system returns data to the prepaid database to allow the account of the

requesting mobile to be incremented by the face value of the scratch card and

update the lifecycle of the customer prepaid account.

30   **Brief Description of the Drawing(s)**

FIG. 1 is a block diagram illustrating the operation of Applicants'

invention; and

FIGs. 2a and 2b is a flow diagram illustrating the operation of Applicants'

invention.

Detailed Description

FIG. 1 is a block diagram illustrating the operation of Applicants' invention. A recharge card management system 1 maintained by the service provider is used to store data for verifying the validity of cards and the identity of

5   the reseller (25,...,26) authorized to manage and sell the cards. The recharge card management system 1 possesses the following functionalities: create card manufacturing order file, inventory the card returned from the manufactures, distribute the cards to distributor, verify the card status for prepaid administration system.

10   The recharge card management system 1 that stores all recharge card information is accessible by the service provider administration users 24, reseller users and distributor users 25,...,26. All cards are identified with reseller account identifications. These users can create new card batches, search and view card information and modify the card status. Each reseller has a plurality of distributors

15   such as distributor 30 which deal with customers such as customer 20. Each reseller can only access entries in the card database for cards associated with its own account identification.

The recharge card management system 1 maintains the user profile that contains information of service provider users, reseller users and distributor users.

20   Users have user id, password for providing reseller account identifications, permissions of access security levels and operation levels, etc. The service provider users as administrative users may access and manage all of recharge cards. Reseller users only access and manage the cards belong to the reseller with the reseller identification associated with this user in the user profile. The user profile is stored

25   in the database of the recharge card management system, and maintained by the service provider, i.e., only administrative users can create, access and modify the profile.

Resellers and distributors can be arranged in a hierarchy, wherein a reseller can control a plurality of first level distributors, each of which can control a

30   plurality of second level distributors, etc. A user of a first level distributor can only access its own card database and that of second level distributors controlled by that first level distributor; the reseller can access card databases of all first, second,..., etc. level distributors which it owns or controls, directly or indirectly.

The account identification of the distributor that sells the card allows this access to be enforceable.

During the creation of card manufacturing order file, the system users access the system remotely via user browser, and use a GUI (Graphical User Interface) screen to create the manufacturing order file. The manufacturing order file includes, but is not limited to, contract number, manufacturer name, reseller name and account identification, batch number, serial number (for example, 1 to 10,000), and the random card number (scratch number, sometimes called a Personal Identification Number (PIN)) that is associated with each of the cards, creation date and other information. One manufacturing order file can include one scratch card batch, or multiple batches with the same or different reseller identification, or a group of batches with a group number. One group may contain one or multiple batches with the same or different reseller identification. All of the manufacturing order files created within the system are stored in the database for searching and viewing late by the system users.

The manufacturing order file after creation is securely encrypted and sent to the manufacturer. A card manufacturer 35 manufactures a batch of cards, and returns them to the associated reseller(s).

The reseller then books the card into the recharge card management system via the GUI interface, to create a card inventory. The reseller updates the manufacturing order in the inventory, accepts or rejects cards either individually or in batches. The inventory function also allows the reseller to track the location of the scratch card batches and dispose of the scratch cards as returned, cancelled or expired. The recharge card management system maintains all inventory data in the database. The inventory data is searched and viewed by the system users via GUI screen.

The inventoried cards are distributed to distributors for sale. The distribution process is completed by the recharge card management system. All distribution information is stored in that database 2. A distribution order can be from one distributor to another sub-distributor creating a hierarchical distribution system. The distribution hierarchy can be defined as a multiple levels. When the reseller or distributor sells a card, they update the database of the data associated with the card via GUI screen when accessing the card management system 1.

Subsequently, the customer 20 who has purchased this card accesses the prepaid administration system 11. The customer dials an 800 number and is connected to a response system 13 of the prepaid administration system 11. In response to requests from the response system, the customer provides the scratch

5   number using the customer's dualtone multifrequency (DTMF) keypad. The prepaid administration system 11 searches the subscriber database and finds out the reseller account identification associated with this customer. A mobile phone is issued by this reseller and the reseller account identification has been stored in the database of the prepaid administration system 11. The prepaid administration

10   system then queries the recharge card management system with the scratch card number inputted by the customer. The recharge card management system verifies that the scratch card is legitimate, identifies the reseller to whom this scratch card was sold, and verifies the face value of the scratch card through its database. If the card is valid (i.e., activated), the recharge card management system returns the face

15   value of card along with the reseller account identification associated with this card back to the prepaid administration system. If the card is used, canceled, expired or deactivated, the recharge card management system will return error response. When the prepaid administration system receives a positive response with the card face value and reseller account identification, it compares the account

20   identification with that obtained from its own database. If the two match (i.e., the scratch card is issued by the same reseller of the mobile phone subscriber), the prepaid system allows the account of the requesting mobile subscriber to be incremented by the face value of the scratch card and the lifecycle of the customer prepaid account updated.

25   For a system such as the one described herein to work, it is essential that security be maintained. The first step in the security system is that the manufacturer maintains strict control of manufactured cards. The messages sent by service providers or resellers accessing the recharge card management system to create a scratch card manufacturing order file which contains manufacturer name,

30   reseller name and account identification, card number, batch number, serial number, creation data (or timestamp) and other information, should be securely encrypted before being transmitted to the manufacturer. The manufacturer will decrypt the manufacturing order file with the same security key after receiving it.

The next step is distribution to the resellers and thence the distributors. Each reseller or distributor can access data in the recharge card management system only for cards in its own hierarchy; data access includes the ability to search and view card information and status, change card status

5   (activated/deactivated, used, expired, suspended, canceled, deleted).

FIG. 2 is a flow diagram illustrating the operation of Applicants' invention. A service provider user 24 or reseller user 25,...,26 accesses the recharge card management system 1 and uses the system to create a new scratch card manufacturing order file (action block 201). The manufacturing order file includes

10   contract number, manufacturer name, reseller name and account identification, batch number, serial number (for example, 1 to 10,000), and the random card number (scratch number, sometimes called a Personal Identification number (PIN)) that is associated with each of the cards, creation date (or timestamp) and other information. The manufacturing order file is securely encrypted and sent to the

15   manufacturer 35 (action block 203). The manufacturer produces the cards and sends them to the reseller and/or distributor (action block 205). Each card has a hidden scratch number and a visible batch and serial number.

The reseller 25,...,26 enters the cards into its inventory and notifies the Recharge Card Management System 1 (action block 207). Each distributor 30 then

20   orders cards from the reseller 25,...,26 (action block 209). The distributor acknowledges receipt of the cards (action block 211) and activates the card in the recharge card management system 1 (action block 213). The distributor 30 sells the card to a customer 20 (action block 215). The customer calls an 800 number or uses the Internet to access the prepaid administration system 11 (action block 217)

25   to transfer the scratch card face value to his/her prepaid account. In order to do so, the customer supplies its mobile identification number for mobile telephones, or automatically identified telephone number for landlines (action block 219). The customer supplies the scratch card number, obtained by scratching off the coating covering the scratch number (action block 221). The prepaid administration

30   system 11 checks the account identification of the customer from its database when using his/her mobile identification as key, then sends both the scratch card number to the recharge card management system 1 for validation (action block 223). The recharge card management system 1 verifies that the scratch card is legitimate, identifies the reseller to whom this scratch card was sold, and verifies the face

value of the scratch card through its database 2 (action block 225). If the card is legitimate (i.e., activated), the recharge card management system 1 returns the face value of card along with the reseller account identification associated with this card back to the prepaid administration system 11 (action block 227). If the card is used,

5 expired or deactivated, the recharge card management system will return error response (action block 235). When the prepaid administration system receives a positive response with the card face value and reseller account identification, it compares the account identification with that obtained from its own database (action block 229). If the two match (i.e., the scratch card is issued by the same

10 reseller of the mobile phone subscriber), the prepaid administration system 11 increments the customer prepaid account by the face value of the scratch card, update the customer prepaid account lifecycle, and acknowledge both of the recharge card management system and the customer 20 for success recharge (action block 231).

15 If a customer served by Reseller A were to use a scratch card issued by reseller B to replenish his/her account, the customer calls the prepaid administration system 11 and provides the scratch card number. The prepaid administration system 11 obtains his account identification (equal to reseller A's account identification) from his/her prepaid database, and sends the card number to

20 the Recharge Card Management System 1 for validation. The recharge card management system 1 finds the card number is valid but it is associated with another account identification belong to reseller B; the recharge card management system 1 returns the card face value and account identification of reseller B to the prepaid administration system. The prepaid administration system compared the

25 received reseller account identification (reseller B) with the account identification obtained from its own database (reseller A), and finds two are not match. The prepaid administration system notices the customer indicating the replenishment is not allowed because a wrong card was used, and also sends error message to the recharge card management system indicating the recharge failed.

30 After validating the scratch card and sending a positive response to and receiving acknowledgement from the prepaid administration system 11, the recharge card management system 1 will mark the card as used in its database 2 (action block 233).

The customer activates the account in the Prepaid Management System by supplying data (scratch card number, telephone or mobile telephone number (automatically supplied) that the customer may not want the reseller to know. The customer identifies the scratch card number by removing the protective covering

5   on the card; the reseller's agent does not know the scratch card number; if the reseller's agent knew the scratch number, he/she could steal the prepayment and have it entered into his/her prepayment account

The above description is of one preferred embodiment of Applicants' invention. Other embodiments will be apparent to those of ordinary skill in the art

10   without departing from the scope of Applicants' invention. The invention is limited only by the attached claims.